

What is claimed is:

1. A method for the preparation of sevoflurane which comprises:
  - 5 (a) providing a liquid mixture of  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$ , hydrogen fluoride, and an amine; and
  - (b) reacting the mixture; to form  $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$ .
- 10 2. The method of claim 1, wherein the mixture is reacted by heating.
3. The method of claim 1, wherein the mixture is reacted by heating at  $40^\circ\text{C}$  to  $80^\circ\text{C}$ .
- 15 4. The method of claim 1, wherein the mixture is reacted by heating at  $55^\circ\text{C}$  to  $65^\circ\text{C}$ .
5. The method of claim 1, wherein the amine is selected from a primary amine, a secondary amine, or a tertiary amine.
- 20 6. The method of claim 5, wherein the amine is selected from propylamine or diethylamine.
7. The method of claim 5, wherein the amine is a tertiary amine.
- 25 8. The method of claim 7, wherein the tertiary amine is a trialkylamine.
9. The method of claim 8, wherein the trialkylamine is selected from triethylamine, tripropylamine, triisopropylamine, tributylamine, dimethyl ethyl amine, di-isopropyl ethyl amine, or mixtures thereof.
- 30 10. The method of claim 1, wherein the amine is a cyclic amine.
- 35 11. The method of claim 10, wherein the cyclic amine is selected from pyrrolidine, N-methyl pyrrolidine, or piperidine.

12. The method of claim 1, wherein the mixture comprises  $(\text{CF}_3)_2\text{CHOCHCl}_2$ .
- 5 13. The method of claim 12, wherein the mixture comprises from 0.01 to 20 percent by weight of  $(\text{CF}_3)_2\text{CHOCHCl}_2$ .
14. The method of claim 1, wherein the mixture comprises water.
- 10 15. The method of claim 14, wherein the mixture comprises 1 to 25 percent by weight of water.
16. The method of claim 14, wherein the mixture comprises 1 to 15 percent by weight of water.
- 15 17. The method of claim 14, wherein the mixture comprises 3 to 10 percent by weight of water.
18. The method of claim 1, wherein the mole ratio of the  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$  to the hydrogen fluoride is from 1:1 to 1:2.
- 20 19. The method of claim 1, wherein the mole ratio of the  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$  to the amine is from 1:0.3 to 1:2.
- 25 20. The method of claim 3, wherein the mixture is reacted for 4 to 12 hours.
21. The method of claim 3, wherein the mixture is reacted for 4 to 10 hours.
- 30 22. The method of claim 3, wherein the mixture is reacted for 4 to 7 hours.
23. The method of claim 1, wherein the yield of the reaction is at least 50 percent.
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24. The method of claim 1, wherein the yield of the reaction is at least 65 percent.

25. The method of claim 1, wherein the yield of the reaction is at least 75 percent.

26. The method of claim 1, wherein the conversion of the reaction is at least 50 percent.

27. The method of claim 1, wherein the conversion of the reaction is at least 60 percent.

28. The method of claim 1, wherein the conversion of the reaction is at least 70 percent.

29. The method of claim 1, comprising separating the  $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$  from the mixture after the mixture has reacted by washing the mixture with water.

30. The method of claim 1, comprising separating the  $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$  from the mixture by steam distillation.

31. The method of claim 1, comprising separating the  $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$  from the mixture by fractional distillation.

32. The method of claim 1, comprising separating the  $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$  from the mixture by distillation with an inert high boiling solvent having a boiling point above that of sevoflurane.

33. The method of claim 32, wherein the high boiling solvent is an aromatic hydrocarbon.

34. The method of claim 33, wherein the aromatic hydrocarbon is xylene.

35. The method of claim 32, wherein the distillation with the inert high boiling solvent proceeds simultaneously with reacting the mixture.

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- (a) providing  $(\text{CF}_3)_2\text{CHOCH}_3$ ;
  - (b) contacting the  $(\text{CF}_3)_2\text{CHOCH}_3$  with chlorine gas;
  - (c) exposing the mixture to a sufficient amount of light to initiate
  - 10 and sustain an exothermic reaction;
  - (d) allowing the exothermic reaction to proceed to produce a  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$  intermediate; and
  - (e) reacting in a liquid mixture the  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$  intermediate with hydrogen fluoride and an amine;
  - 15 to form  $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$ .

37. The method of claim 36, wherein the  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$  intermediate is reacted with the amine and the hydrogen fluoride by heating.

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38. The method of claim 36, wherein the  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$  intermediate is reacted with the amine and the hydrogen fluoride by heating at  $40^\circ\text{C}$  to  $80^\circ\text{C}$ .

25           39. The method of claim 36, wherein the  $(\text{CF}_3)_2\text{CHOCH}_2\text{Cl}$  intermediate is reacted with the amine and the hydrogen fluoride by heating at  $55^\circ\text{C}$  to  $65^\circ\text{C}$ .

40. The method of claim 36, wherein the light is ultraviolet light.

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41. The method of claim 36, wherein the amine is a tertiary amine.

42. The method of claim 41, wherein the tertiary amine is selected from triethylamine, tripropylamine, triisopropylamine, tributylamine, dimethyl ethyl amine, di-isopropyl ethyl amine, N-methyl pyrrolidine, or mixtures thereof.

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